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### ABSTRACT

Monazites and xenotimes are rare-earth phosphates showing a combination of properties expected to be suitable for thermal barrier coatings. For example, lanthanum phosphate (La-monazite) can be used to form thermal barrier coatings to protect superalloy and ceramic parts exposed to high temperature and damage by sulfur, vanadium, phosphorus and other contaminants. The monazite or xenotime coatings can be applied using any of the common application methods including EB-PVD, laser ablation and plasma spraying. The stoichiometry of the coatings can be modulated according to the stoichiometry of specially prepared starting target (source) material. The most effective coatings appear to be largely crystalline and show a columnar structure with feather-like microstructure. For La-monazite, effective coatings between 10 and 500 micrometers in thickness can be deposited on substrates having temperatures between about 750°C and about 950°C.

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